AMENDMENT(S) TO THE DRAWINGS

Please amend Figs. 3 and 4 with the replacement of German words with English words as reflected in the replacement sheet. The replacement sheet presenting replacement figures, which incorporate the desired changes is enclosed.

REMARKS

Claims 1-22 are pending and rejected in this application. Claim 13 is amended hereby and claim 23 is added hereby.

Responsive to the rejection of the claim 13 under 35 U.S.C. § 112, second paragraph, Applicants have amended claim 13 placing it independent form and specifically indicating a partial refining prior to loading step. For the forgoing reasons Applicants submit that claim 13 is definite and does particularly point out distinctly claim the subject matter, which Applicants regard as the invention.

Responsive to the rejection of claims 1-6 under 35 U.S.C. § 102(b) as being anticipated by or in the alternative under 35 U.S.C. § 103(a) as being obvious over US Patent No. 5,223,090 (Klungness, et al.), Applicants respectively traverse the rejection and submit that claims 1-6 are in condition for allowance.

Klungness et al. discloses a method of fiber loading a chemical compound. Calcium oxide (lime) or calcium hydroxide is mixed with dewatered crumb pulp having the desired level of moisture. The calcium oxide can be added to the water used for reconstituting dried fibers prior to adding the water to the fibers. Upon adding the calcium oxide to a dewatered crumb pulp and simple mixing for a period of a few minutes, the calcium oxide combines with the water to form calcium hydroxide within the mass of fibers in the pulp (column 6, lines 8-17). The calcium oxide or calcium hydroxide may be added at any desired level up to about 50%, based on the weight of the dry cellulosic material. The lower limit for addition of the calcium oxide may be as low as desired, but is preferably not less than about 0.1%. Most preferably, the calcium oxide or calcium hydroxide is present at a level of from about 10% to about 40%, on a per weight basis. Carbon dioxide is added at a level sufficient to cause complete reaction of the chemical with the

gas to form calcium carbonate (column 6, lines 38-48). In the case of paper pulp, the paper pulp can be immediately transferred to a papermaking operation where it is formed into a slurry, refined and placed onto a Fourdrinier machine or other suitable papermaking apparatus (column 6, lines 56-59). The precipitation of calcium carbonate in cellulosic fibers containing from about 40% to about 85% moisture (15% to 60% of fiber) and loaded with from about 10% to about 40% of calcium oxide or calcium hydroxide is easily effected in a pressurized container with low shear mixing. The carbon dioxide pressure in the container is preferably from about 5 psig to about 60 psig, and the low shear mixing is preferably continued for a period of from about 1 minute to about 60 minutes. It has also been determined that for fibers containing from about 95% to about 85% moisture (5% to 15% of fiber) and the same calcium oxide loading, that high shear treatment during contact with the carbon dioxide is required to cause complete precipitation of calcium carbonate (column 6, line 64 through column 7, line 11). A simple way to provide contact of the carbon dioxide with the paper pulp under high shear treatment is by use of a pressurized refiner. The refiner is a cylindrical hopper into which the paper pulp is loaded. The cylindrical hopper is gas tight and can be pressurized with a gas. A rotating shaft containing beater arms is disposed within the hopper to keep the paper pulp from matting. An auger screw is located beneath the hopper for conveying the paper pulp into the interior space between a set of matched discs. The discs shred the pulp crumbs as the pulp passes therebetween. Prior to forcing the pulp into contact with the rotating one of the matched discs, the carbon dioxide is pumped into the sealed hopper to pressurize the hopper, the carbon dioxide remaining in contact with the pulp while the paper pulp is stirred in the hopper and while the pulp is being transported by the auger through the refiner discs (column 7, lines 16-41). In a typical refiner run procedure the pulp, calcium reactant and water are first mixed in a steel bowl using a Hobart mixer. The high consistency pulp is then

loaded into a hopper of a refiner which is closed and sealed. Therein the pulp is then refined in a carbon dioxide atmosphere (column 8, lines 17-51).

In contrast, claim 1 recites in part:

> loading said fibers with a precipitation product, without refining the fiber stock;
>
> refining said fibers after said loading step, whereby said refining step at least one of improves a freeness value and alters characteristic of said fibers;

(Emphasis added). Applicants submit that such an invention is neither taught, disclosed nor suggested by Klungness, et al. or any of the other cited references, alone or in combination, and has distinct advantages thereover.

Klungness discloses a method of fiber loading a chemical compound, including a high sheer treatment utilized within a pressurized refiner. Pressurized carbon dioxide is pumped into a sealed hopper and the pulp comes into contact with rotating matched discs, which refine the fibers. In contrast, the present invention loads the fibers with a precipitation product without refining the fiber stock. It is only after the loading step that the fibers are altered so as to improve a freeness value and/or a physical characteristic of the fibers. Applicants method provides a savings in refining energy of 5% to 70% specific to the pure fiber volume. The strengths, optical characteristics, the porosity and the formation of the produced paper are retained or even improved as compared to the refining of pulp without filler or where the filler calcium carbonate is added in a conventional way. Klungness teaches the precipitation of calcium carbonate during a refining process which occurs with carbon dioxide being injected into the sealed hopper. It is at that stage that the calcium carbonate is precipitated in the pulp fibers and the pulp is refined in the carbon dioxide atmosphere, thereby providing intimate contact between the carbonate and the fibers. The Klungness invention does not improve freeness values or alter characteristics of the fibers but improves the contact of the carbon dioxide with the paper pulp under high shear

treatments. In contrast the Applicants invention loads the fibers prior to refining. Therefore, Klungness, et al. and any of the other cited references, alone or in combination, fail to disclose, teach or suggest loading the fibers with a precipitation product without refining the fiber stock and then refining the fibers after the loading step, whereby the refining step improves a freeness and/or alters characteristics of the fibers, as recited in claim 1.

An advantage of Applicants' invention is that it can be utilized in the production of paper having a higher filler content, since the filler no longer needs to be washed out as in conventional methods. For the forgoing reasons, Applicants submit that claim 1 and 2-6 depending therefrom, are in condition for allowance, the allowance of which is hereby respectfully requested.

Claims 7-10 and 12 have been rejected under 35 U.S.C. § 103(b) as being unpatentable over Klungness, et al. and in further view of US Patent No. 6,059,924 (Hoskins). However, claims 7-10 and 12 depend from claim 1, which is in condition for allowance for the reasons given above. For the foregoing reasons Applicants respectfully request the allowance of claims 7-10 and 12.

Responsive to the rejection of claim 13 under 35 U.S.C. § 103(b) as being unpatentable over Klungness, et al. and in further view of US Patent No. 6,355,138 (Doelle), Applicants have amended claim 13 and submit that claim 13 is now in condition for allowance.

Doelle discloses a method of chemically loading fibers in a fiber suspension (Fig. 1) including a first fluffer 18 and a second fluffer 20 each including a pair of refiner plates 32, which are carried by and rotationally driven by a common drive shaft 34. Each refiner plate 32 has an axially facing contoured refining surface 38, which faces toward and co-acts with a complimentary refiner plate 32 (column 3, lines 37-43). As can be seen in Fig. 1, fluffer 18 provides a refining action prior to the introduction of the slurry to a reactant gas generator, and a

refining section 20 that refines the resultant suspension prior to discharge from the apparatus (Fig. 1).

In contrast claim 13 recites in part:

partially refining said fiber suspension prior to said loading step.

(Emphasis added). Applicants submit that such an invention is neither taught, disclosed nor suggested by Klungness, et al., Doelle or any of the other cited references, alone or in combination and includes distinct advantages thereover.

Klungness, et al. discloses a method of fiber loading a chemical compound on fiber including the loading of the fiber in the presence of carbon dioxide under pressure including using a refining disc to shred pulp crumbs as the pulp passes between the discs. Doelle discloses the addition of a reactant solid with the fiber suspension as it enters a refining stage. In contrast, the present invention partially refines the fiber prior to the step of loading the fibers without refining during the loading step, then executing a refining step, which is in contrast to the cited prior art. Therefore Klungness, et al., Doelle and any of the other cited references, alone or in combination, failed to disclose, teach or suggest the step of partially refining the fiber suspension prior to a loading step, as recited in claim 13.

An advantage of Applicants' invention is that it can be utilized in the production of paper having a higher filler content, since the filler no longer needs to be washed out as in conventional methods. For the forgoing reasons, Applicants submit that claim 13 and claim 14 depending therefrom, are in condition for allowance, the allowance of which is hereby respectfully requested.

Claims 10-12, 14 and 15 are rejected under 35 U.S.C. §103(a) as being unpatentable over Klungness in further view of US Patent No. 5,776,305 (Sabourin). However, claims 10-12 and 15 depend from claim 1; and claim 14 depends from claim 13, and claims 1 and 13 are in condition

for allowance for the reasons given herein. For the foregoing reasons Applicants respectfully request the allowance of claims 10-12, 14 and 15.

Responsive to the rejection of claim 13 under 35 U.S.C. §103(a) as being unpatentable over Klungness and in further view of Sabourin, Applicants have amended claim 13 and submit that claim 13 is now in condition for allowance.

Sabourin discloses a low-resident, high-temperature, high-speed chip refining method (Fig. 1) for refining lignocellulose-containing material into pulp in a disk refiner. The material is heated and subjected to high speed refining in a disk refiner to produce pulp. The resulting pulp may then be subject to a secondary refining step to produce paper quality pulp (Abstract).

In contrast claim 13 recites in part:

> partially refining said fiber suspension prior to said loading step.

(Emphasis added). Applicants submit that such an invention is neither taught, disclosed nor suggested by Klungness, et al., Sabourin or any of the other cited references, alone or in combination and includes distinct advantages thereover.

Klungness, et al. discloses a method of fiber loading a chemical compound on fiber including the loading of the fiber in the presence of carbon dioxide under pressure including using a refining disc to shred pulp crumbs as the pulp passes between the discs. Sabourin discloses a low-resident, high-temperature, high-speed chip refining method for refining lignocellulose-containing material into pulp in a disk refiner. In contrast, the present invention partially refines the fiber prior to the step of loading the fibers without refining during the loading step, then executing a refining step, which is in contrast to the cited prior art. Therefore Klungness, et al., Sabourin and any of the other cited references, alone or in combination, failed to disclose, teach or suggest the step of partially refining the fiber suspension prior to a loading step, as recited in

claim 13.

An advantage of Applicants' invention is that it can be utilized in the production of paper having a higher filler content, since the filler no longer needs to be washed out as in conventional methods. For the forgoing reasons, Applicants submit that claim 13 is in condition for allowance, the allowance of which is hereby respectfully requested.

Claims 16-22 are rejected under 35 U.S.C. §103(a) as being unpatentable over Klungness et al. and in further view of US Patent No. 5,954,283 (Matthew). However claims 16-22 depend from claim 1, which is in condition for allowance for the reasons given above. For the forgoing reasons Applicants submit that claims 16-22 are in condition for allowance, which is hereby respectfully requested.

Responsive to the Examiner's indication that English words needed to be used relative to Figs. 3 and 4, Applicants have amended the figures replacing the German words with English words.

Claim 23 is added hereby to further protect Applicants' valuable intellectual property. The elements of new claim 23 include the elements of claim 1, without the alternative limitation relative to freeness and characteristics of the fibers. No new matter was added by adding this claim.

For the foregoing reasons, Applicants submit that the pending claims are definite and do particularly point out and distinctly claim the subject matter which Applicants regard as the invention. Moreover, Applicants submit that no combination of the cited references teaches, discloses or suggests the subject matter of the amended claims. The pending claims are therefore in condition for allowance, and Applicants respectfully request withdrawal of all rejections and allowance of the claims.

In the event Applicants have overlooked the need for an extension of time, an additional extension of time, payment of fee, or additional payment of fee, Applicants hereby conditionally petition therefor and authorizes that any charges be made to Deposit Account No. 20-0095, TAYLOR & AUST, P.C.

Should any question concerning any of the foregoing arise, the Examiner is invited to telephone the undersigned at (260) 897-3400.

Respectfully submitted,

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May 6, 2005
Date